PITTSBURGH AUTOMOTIVE

Cylinder Leak-Down Tester

When unpacking, make sure that the product is intact and undamaged.
If any parts are missing or broken, please call 1-800-444-3353 as soon as possible.

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Item 94190

INSTRUCTIONS AND PRECAUTIONS

Visit our website at:
http://www.harborfreight.com

For technical questions or replacement parts, please call 1-800-444-3353.

⚠WARNING

Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.

Manual Revised 09b; 11c; 11f

Specifications

Adapters Included	12mm and 14mm Spark Plug Adapters
Gauges	2½ IN. dia. rubber protected
Gauge Scale	0 to 100 PSI in 2 PSI increments; 0 - 7 bar in 0.2 bar increments
Maximum Air Pressure	100 PSI

Important Safety Information

1. **Keep work area clean**. Cluttered areas invite injuries.
2. **Observe work area conditions**. Do not use machines or power tools in damp or wet locations. Don't expose to rain. Keep work area well lighted. Do not use electrically powered tools in the presence of flammable gases or liquids. Be aware of the inherent dangers of working on a gasoline engine.
3. **Keep children away**. Children must never be allowed in the work area. Do not let them handle machines, tools, or extension cords.
4. **Store idle equipment**. When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep out of reach of children.
5. **Use the right tool for the job**. This cylinder tester is intended for use in gasoline powered engines. Do not modify this tool and do not use this tool for a purpose for which it was not intended.
6. **Dress properly**. Do not wear loose clothing or jewelry as they can be caught in moving parts. Protective, electrically nonconductive clothes and nonskid footwear are recommended when working. Wear restrictive hair covering to contain long hair.
7. **Wear ANSI-approved impact safety goggles when working on gasoline engines.**
8. Be sure to work in a well ventilated place, or pipe exhaust gasses to the outdoors. Guard against exposure to Carbon Monoxide, which is an odorless, colorless gas produced by gasoline engines. Carbon Monoxide exposure may cause serious injury or death.
9. **Do not overreach**. Keep proper footing and balance at all times. Do not reach over or across running machines.
10. **Maintain tools with care**. Keep tester threads sharp and clean for better and safer performance. Follow instructions for lubricating and changing accessories. The gauge hose and adapters must be kept clean, dry, and free from oil and grease at all times.
11. **Stay alert**. Watch what you are doing, use common sense. Do not operate any tool when you are tired.
12. **Check for damaged parts**. Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function. Any part that is damaged should be properly repaired or replaced by a qualified technician.
13. **Replacement parts and accessories**. When servicing, use only identical replacement parts. Use of any other parts will void the warranty.
14. **Do not operate tool if under the influence of alcohol or drugs**. Read warning labels on prescriptions to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not operate the tool.

15. **Maintenance**. For your safety, service and maintenance should be performed regularly by a qualified technician.
16. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near coil, spark plug cables, or distributor of running engine. Engine should be off during distributor adjustment.
17. **WARNING:** The brass components of this product contain lead, a chemical known to the State of California to cause birth defects (or other reproductive harm). (California Health & Safety code 25249.5, *et seq.*)
18. The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

SAVE THESE INSTRUCTIONS.

About Cylinder Leak Testing

A Cylinder Leak-Down Tester can give you valuable information about the engine's compression. Pressurized air is supplied to each cylinder, and the rate of leakage is measured in percent loss from 0% to 100%.

The operator may also locate the source of the compression loss by listening at these places:

a. Oil dipstick tube for leaking cylinder rings.

b. Radiator fill cap for cylinder wall cracks.

c. Adjacent port for head gasket leaking.

d. Tailpipe for exhaust valve leaks.

e. Carburetor air horn for intake valve leakage.

f. Fuel injector body for intake valve leakage.

If you are not experienced in doing this type of diagnostic test, the work should be done by a qualified technician.

Important Considerations About Compression Loss Testing

1. There will always be some compression loss past piston rings, even in a new engine. You will never see a 0% compression loss, and this lost pressure should be audible at the oil dipstick port.
2. If the Gauge shows very high or 100% compression loss, the cylinder may not be at Top Dead Center (TDC) on the **compression** stroke. Make sure the cylinder is at TDC, so the

valves are closed. Reference your vehicle service manual for instructions on how to do this.

3. A “good” reading will show compression loss of all cylinders at about the same rate. A large difference of 15% to 30% comparing one cylinder to the others indicates a problem.
4. Leakage rate readings may vary by up to 10% when taking repeated readings of the same cylinder. Piston position and engine temperature can cause variable readings. Take several readings and average the results for a recorded reading for each cylinder.
5. Diagnosing an engine problem with this tool involves using a listening device (not included). A length of hose or a mechanic’s stethoscope are suggested.
6. The lower the sound pitch of escaping pressure indicates a larger leak. Small leaks will typically make a higher pitched sound.
7. If the vehicle has multiple problems, the Cylinder Leakage Tester may show only the most pronounced problems. A large problem may overwhelm a smaller problem during testing.

Operating Instructions

Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this document including all text under subheadings therein before set up or use of this product.

IMPORTANT NOTE: Be sure the Regulator Knob (9) is turned fully counterclockwise before connecting the Cylinder Leakage Tester to a pressurized air source. Failure to do so may result in damage to the tool.

NOTE: The engine must be at normal operating temperature for accurate testing. Start the engine and let it warm up to normal operating temperature, then turn it off for testing.

WARNING! Always run an engine in a well ventilated space. Running engines produce Carbon Monoxide, a colorless, odorless gas which can cause serious personal injury or death if inhaled.

WARNING! Wear protective gloves and ANSI-approved eye protection when working on a hot engine. Keep hands away from the fan and other moving parts, and protect yourself from electrical shock or burns. Be aware that working on a gasoline engine is inherently dangerous, and suitable precautions must be taken.

1. Before removing the spark plugs, clean the area around the spark plugs using compressed air. It is important to prevent foreign materials from falling into the cylinders once the spark plugs are removed.
2. Disconnect the coil wire from the coil, and remove all spark plugs. Note the position of the wires so that the correct wire may be replaced on each plug at the end of the job. On engines with two spark plugs per cylinder, remove only one plug per cylinder.
3. Remove the oil dipstick, radiator cap, and disconnect one end of the PCV hose. If the engine has a carburetor, remove the air cleaner and open the throttle all the way. If the engine is fuel injected, remove the air cleaner or open the throttle body.
4. Position the cylinder to be tested at TDC on the compression stroke so all valves are closed.
5. Turn the Regulator Knob fully counterclockwise. Connect the Cylinder Leak-Down Tester to a

compressed air source (not included) at the male Quick Connector (8).

NOTE: Set the air compressor's regulator to 7 to 100 PSI. Never operate this tester with air pressure set higher than 100 PSI, which can damage this tool.

6. Turn the Regulator Knob (9) clockwise until the Gauge (6) reads "0" (zero) at the end of the yellow band.
7. Hand screw the Adapter Hose (10) into the spark plug hole of the cylinder to be tested. Connect the male end of the adapter Hose to the female coupler of the Extension Hose (4).
8. You can now read the amount of leakage on the Gauge (6) as a percentage loss.
9. Test the remaining cylinders to determine which if any cylinders are bad.
10. Use the diagnostic techniques in the next section to determine the cause of the problem.

Diagnostic Techniques

If one or more cylinders are identified as having 15% to 30% greater compression loss than the others, you can listen for escaping air pressure to diagnose the problem. Air escaping at the following locations indicates a potential problem.

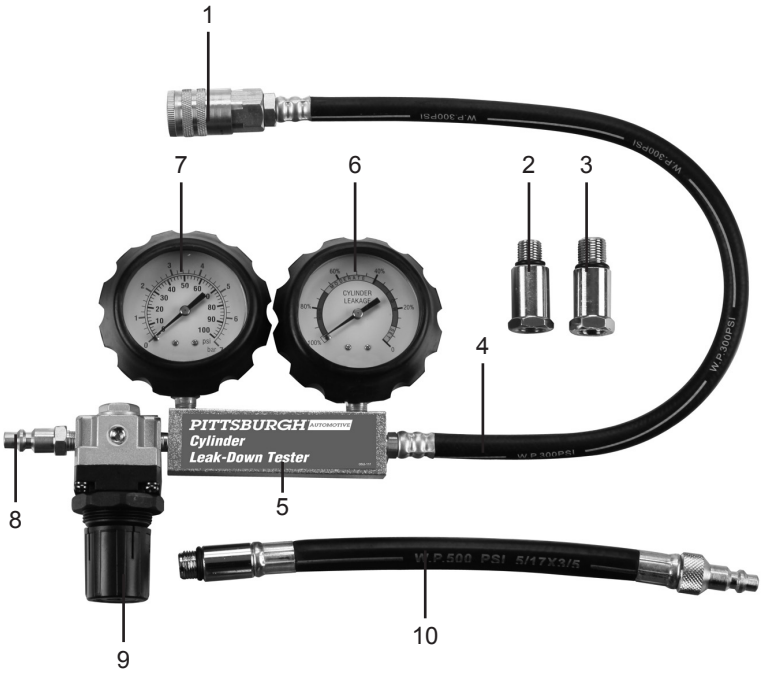
1. Oil dipstick tube indicates pressure escaping from the cylinder into the oil jacket. This usually indicates stuck, burned or worn rings or cylinder walls.
2. Radiator filler opening bubbles or sound indicates pressure escaping into the coolant jacket. This can indicate cracked cylinder walls or a damaged head gasket. In case of a damaged head gasket, often two or more adjacent cylinders will show the same problem.
3. Adjacent cylinder indicates a damaged head gasket.
4. Tail pipe indicates burned, stuck or worn exhaust valve.
5. Carburetor or fuel injector intake indicates stuck, burned or worn intake valve.

Maintenance and Servicing

1. **BEFORE EACH USE,** inspect general condition of tool. Check for loose hardware, misalignment or cracked or broken parts, and any other condition that may affect its safe operation.
2. **AFTER USE,** wipe external surfaces of the tool with clean cloth.
3. Periodically check the threads for damage.
4. Keep clean and free from dirt, grease and grit.
5. Release the pressure from the gauge before storing.
6. Store it in its case when not in use.

Parts List and Diagram

Part	Description
1	Female Quick Connector
2	Metric Adapter M12 x 1.25 (with O-Ring)
3	Metric Adapter M14 x 1.5 (with O-Ring)
4	Extension Hose
5	Gauge Base
6	Leakage Gauge
7	Pressure Gauge
8	Male Quick Connector
9	Regulator
10	Adapter Hose



Record Serial Number Here:_____

Note: If product has no serial number, record month and year of purchase instead.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

Limited 90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

PLEASE READ THE FOLLOWING CAREFULLY

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